Hot Air Soldering

Soldering without bits?

By J. Menke

While working for a cellphone manufacturer in the US of A, one of our readers picked up a neat trick using a hot-air gun and some surface-mount ICs.

In a busy development department of an industrial electronics company it just takes too much time fitting surface-mount components to PCBs using a conventional soldering iron. The tool of choice here is the hot-air soldering gun but you need to adjust your soldering techniques to take advantage of this device. After much practice, the author found the following procedure to be both simple and quick when it comes to mounting SMD packaged integrated circuits onto PCBs.

More than just hot air

The PCB pads must first be tinned by melting a small amount of solder onto each pad. The PCB manufacturer will already have pre-tinned the board but you need to add a little extra. The amount that you add now will form the finished joint between each component lead and pad, so try to make an equal dome of solder on all the pads.

Check the orientation of the component to the Layout (pin 1 to pad 1) and position the component as shown in **Figure 1**. Place a small dab of flux onto each pad and lead. Now with a hot-air gun set to approximately 290°C adjust the air flow rate to a gentle stream and with the hot air nozzle at a distance of between 5 and 15 mm, direct the stream of hot air over the component leads and pads so that they are evenly heated and no localised hot-spots are formed.

As soon as you are sure that all the pads and leads are up to temperature (the solder takes on a bright shiny mercury-like appearance), quickly slide the component onto the pads using tweezers. Alternatively tap the PCB with the tweezers so that the component slides onto the pads. As the molten solder touches the leads, it will magically draw the component into its correct position and centre it neatly on the pads.

The entire process should not take any longer than 20 seconds. If you are not successful after this time, remove the gun and wait for everything to cool down before cleaning, re-fluxing and trying again. Prolonged heating risks permanent damage to the component and PCB.

As with all surface-mount work, this method needs a very steady hand and some practice to avoid solder bridges between pads but a competent technician using this technique should be able to solder at a rate of around 100 leads every 10 to 20 seconds, quite a bit faster than automated placement machines!

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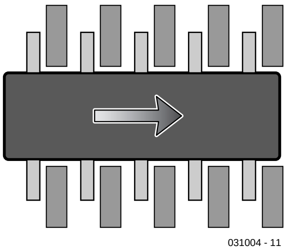

Figure 1. Position the component leads between the pads and slide into position as the solder flows.